REMARKS

Applicants have amended claims 1, 13, and 14, and canceled claim 11. Claims 1-10 and 12-26, of which claims 1, 13 and 14 are in independent form, are presented for examination.

Applicants have discovered methods of purifying substances, such as biological substances, from a mixture using magnetic particles that specifically bind to the substances. The methods include using a surface tension releasing agent to enhance adherence of the magnetic particles to a probe inserted into the mixture to remove the particles as completely as possible.

Under 35 U.S.C. § 103(a), claims 1, 2, 7-17, and 22-26 are rejected as being unpatentable over U.S. Patent No. 5,705,628 (Hawkins) in view of U.S. Patent No. 4,272,510 (Smith); and claims 1-6, 9, 13, 14, and 18-21 are rejected as being unpatentable over U.S. Patent No. 4,454,234 (Czerlinski) in view of Smith. As amended, the claims include the features of now-canceled claim 11, namely, that the size of the magnetic particles is less than 50 microns. Claim 11 was not rejected as being unpatentable over Czerlinski in view of Smith, so accordingly, this rejection should be withdrawn.

The only remaining rejection then, is based on Hawkins in view of Smith. The Examiner has acknowledged that Hawkins fails to teach using a magnetic probe to separate magnetic particles from a mixture and to transfer the particles, and has relied on Smith for the missing features.

But one skilled in the art would not have used Smith's technique for the type of particles that Hawkins describes. Hawkins discloses using particles that range from about 0.1 micron mean diameter to about 100 microns mean diameter (col., 4, lines 12-14). Smith, on the other hand, discloses using much larger particles having a diameter range of from about 0.1 mm to about 2.0 cm (col. 3, lines 61-65). The relatively heavy macroscopic particles will tend to fall readily to the bottom, while microscopic particles move freely to form suspensions such that separation with a magnetic probe would be quite different. Also, the magnetic behavior of such macroscopic particles is very much different from that of a mass of microscopic particles. In light of these differences, one skilled in the art would not have been motivated to use Smith's techniques with Hawkins's system.

The Examiner has asserted that since the magnetic probe of Smith can attract much larger particles that are at the bottom of the vessel, then there would not be any problem attracting smaller particles, which move freely to form a suspension in the vessel. Rather, the Examiner has proposed, the magnetic probe of Smith must have a stronger magnetic strength to attract large particles, and would be able to attract all the smaller magnetic particles of Hawkins. This reasoning, however, is not correct.

As particles become smaller, they behave more like molecules and are more easily dispersed, for example, as a suspension. As a result, in practice it is more difficult to magnetically attract small particles, particularly as in Smith where the magnetic probe is only inserted into a receptacle and not moved about in the receptacle. (See, e.g., Smith, col. 5, lines 35-52.) In contrast, large particles are more easily separated magnetically because the magnetic attraction increases proportionally to the third power of the diameter of the particles. Additionally, large particles tend to settle and collect at the bottom of a receptacle, where they can be easily collected by the probe. For at least these reasons, Applicants submit that one skilled in the art reading Smith would not have been motivated to use smaller magnetic particles.

Furthermore, Applicants note that neither Hawkins nor Smith recognizes that a surface tension releasing agent can increase the adherence of the magnetic microparticles to the probe, which Applicants recognized can enhance separation by allowing the particles to be removed as completely as possible. Applicants have also discovered that a surface tension releasing agent can decrease adherence of the particles to the walls of a vessel, and further promote adherence of the particles to the probe. Thus, Applicants have discovered an enhanced separation technique that utilizes a combination of a magnetic probe and a surface tension releasing agent.

The Examiner has suggested that the techniques of Smith allows the separation to be performed at a faster pace. However, Applicants reiterate that there is no indication in Hawkins or Smith that one technique is faster than the other.

Moreover, while Smith dates back to 1976, and Applicants understand that magnetic microparticles have been used already at least from that time, no commercial methods using probe separation techniques have been launched until the end of the 1990's.

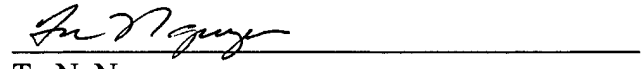
In light of the above amendments and remarks, the rejection should be reconsidered and withdrawn.

Applicants believe the claims are in condition for allowance, which action is requested.

Please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: November 18, 2004



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